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Low HIV-testing rates among younger high-risk homosexual men in Amsterdam

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Objective: To investigate HIV-testing behaviour and HIV prevalence among homosexual visitors of a sexually transmitted infection (STI) outpatient clinic, and to investigate determinants of unknown HIV status, and of HIV testing separately for men with unknown and negative HIV status.
Design: Cross-sectional survey conducted from March 2002 to December 2003 among homosexual men with negative or unknown HIV status visiting the Amsterdam STI clinic.
Methods: A convenience sample of 1201 men with negative or unknown HIV status answered a written questionnaire about history of HIV testing, sexual risk behaviour and behavioural determinants (non-response, 35%). Information was matched to the STI registration system. Associations were determined using logistic regression.
Results: 817 men reported a negative HIV status, and 384 reported an unknown HIV status. The overall HIV prevalence among the 523 men who tested at new STI consultation was 2.8%. The proportion of men with unknown HIV status was relatively high among those diagnosed with infectious syphilis and those reporting unprotected anal intercourse with a casual partner. Their testing rates at new STI clinic visit were lower. Among men with an unknown HIV status, those aged <30 years and reporting risky sexual behaviour tested the least (OR 0.13, 95% CI 0.03 to 0.61).
Conclusion: Although HIV testing rates have increased, they are still lower than in other industrialised countries. Moreover, some men still undertake high-risk sex without knowing their own HIV status, which might pose a risk for ongoing HIV transmission. Therefore, more active testing promotion is needed.

Awareness of one's HIV status plays an important role in strategies to reduce the risk of HIV transmission during sexual intercourse. Furthermore, for HIV-infected individuals, such awareness permits them to make optimal use of the latest therapeutic options. Therefore, regular HIV testing should be encouraged among homosexual men, who remain the group most affected by HIV in industrialised countries.

In 2002, an estimated 54% of homosexual men had ever been tested for HIV in the Netherlands.[1] These ever-testing rates are comparable with rates in the UK,[2 3] but are much lower than in other developed countries.[4–9]

As HIV-testing policy in the Netherlands changed to more actively promoting HIV testing after highly active antiretroviral therapy (HAART) became available, HIV-testing behaviour might be influenced by beliefs one holds about HAART. More optimistic HAART-related beliefs and motivational factors such as safer sex fatigue and sexual sensation seeking are associated with risky, sexual behaviour[10–20] and could, similarly, be associated with HIV testing.

In the present study, firstly, we investigate the HIV-testing behaviour among homosexual men visiting a sexually transmitted infection (STI) clinic in Amsterdam where HIV testing is routinely offered. We describe HIV-testing behaviour at new STI consultation, HIV prevalence and reasons for not testing among homosexual men, according to HIV status. Secondly, we identified determinants associated with having an unknown HIV status (never tested before). Thirdly, we investigate determinants associated with HIV testing among (1) those who never tested before and (2) those who tested HIV negative more than a year ago.

METHODS

The STI clinic in Amsterdam offers sexual health services free of charge, including the diagnosis and treatment of STI. At every new consultation, information about sociodemographic characteristics is routinely collected and entered into a database under a patient-identification code. Patients are routinely screened for infection with chlamydia, rectal gonorrhoea (RG) and infectious syphilis, and HIV testing is routinely offered. An individual can have multiple new consultations in 1 year and/or more than one diagnosis per consultation.

Laboratory methods

A diagnosis of infectious syphilis is based on clinical symptoms and a reactive serology. *Treponema pallidum* haemagglutination assay (Fujirebio, Tokyo, Japan) is used for screening syphilis; when the assay was positive, the Venereal Disease Research Laboratory test (Wellcome, Dartford, England) and the fluorescent treponemal antibody-absorption test (Trepo-spot IF, Biomerieux, Marcy l'Etoile, France) are performed to confirm results. Patients previously treated for syphilis are diagnosed with a new syphilis infection only when there is a threefold or more increase in VDRL titre or when *T pallidum* is demonstrated by dark-field microscopy. A positive culture is the diagnostic criterion for gonorrhoea (GC-Lect agar, BBL, Becton Dickinson, Cockeysville, Maryland, USA). Analysis of HIV antibodies was performed using a commercially available enzyme immunoassay (Axzym; Abbott Laboratories, North Chicago, Illinois, USA) and when positive, confirmed by western blot analyses.

Abbreviations: CP, casual partner; HAART, highly active antiretroviral therapy; RG, rectal gonorrhoea; SP, sexual partner; STI, sexually transmitted infection; UAI, unprotected anal intercourse; VDRL, Venereal Disease Research Laboratory

Table 1 Prevalence of and determinants associated with unknown HIV status (never tested for HIV) among 1201 homosexual men with negative or unknown HIV status visiting the sexually transmitted infection clinic in Amsterdam, The Netherlands, in the period 2002–2003

Determinants	Proportion never tested before, n/n (%)	OR	95% CI	p Value	OR adj*	95% CI	p Value
Age category (years)				<0.01			0.01
<30	94/235 (40.0)	1.82	1.31 to 2.54	<0.01	1.79	1.26 to 2.54	<0.01
30–39	128/478 (26.8)	1			1		
40–49	105/334 (31.4)	1.25	0.92 to 1.71		1.16	0.84 to 1.60	
⩾50	57/154 (37.0)	1.61	1.09 to 2.36	<0.05	1.28	0.86 to 1.91	
Educational level				0.93			
Low	78/249 (31.3)	1					
Middle	156/477 (32.7)	1.07	0.77 to 1.48				
High	145/453 (32.0)	1.03	0.74 to 1.44				
Dutch				<0.01			<0.01
No	23/125 (18.4)	1			1		
Yes	361/1076 (33.6)	2.24	1.40 to 3.58		2.45	1.49 to 4.03	
AI (in the previous 6 months)				<0.01			<0.01
No/protected AI with CP and with SP	187/504 (37.1)	1			1		
UAI with SP only	82/313 (26.2)	0.60	0.44 to 0.82	<0.01	0.61	0.44 to 0.84	<0.01
Unprotected anal intercourse with CP only	65/181 (35.9)	0.95	0.67 to 1.35		1.05	0.72 to 1.54	
UAI with CP and with SP	38/139 (27.3)	0.64	0.42 to 0.97	<0.05	0.67	0.43 to 1.05	
STI diagnosed at new STI consultation							
Infectious syphilis				<0.01			<0.01
No	352/1136 (31.0)	1			1		
Yes	32/65 (49.2)	2.16	1.31 to 3.57		2.63	1.53 to 4.53	
Rectal gonorrhoea				0.10			
No	356/1133 (31.4)	1					
Yes	28/68 (41.2)	1.53	0.93 to 2.52				

	Mean (SD)	OR	95% CI	p Value	ORadj*	95% CI	p Value
HAART-related beliefs (1, disagree; 7, agree)							
Perceiving less HIV/AIDS threat since HAART	2.50 (1.27)	0.93	0.85 to 1.02	0.11			
Perceiving less need for safe sex since HAART	1.18 (0.61)	0.98	0.82 to 1.18	0.86			
Perceiving less risk for HIV transmission due to HAART	2.51 (1.52)	1.04	0.96 to 1.13	0.39			
Perceiving high effectiveness of HAART in curing HIV/AIDS	1.72 (1.14)	1.03	0.93 to 1.15	0.54			
Motivational beliefs (1, low level; 7, high level)							
Safer sex fatigue	2.64 (1.48)	0.92	0.85 to 0.99	0.03	0.93	0.85 to 1.01	0.09
Sexual sensation seeking	5.00 (1.81)	0.98	0.92 to 1.05	0.58			

AI, anal intercourse; CP, casual partner; HAART, highly active antiretroviral therapy; SP, sexual partner; STI, sexually transmitted infection; UAI, unprotected anal intercourse.
*OR adjusted for the other variables included in the multivariate model.

Study procedures

In the period between March 2002 and December 2003, 8166 new consultations were registered at the STI clinic in Amsterdam made by 5403 homosexual men. Those who could speak and write in Dutch were considered eligible for inclusion in the present study, and were requested to fill in a questionnaire not in a systematic way, resulting in a convenience sample. The questionnaire included information about HIV status, sexual behaviour, HAART-related beliefs, safer sex fatigue and sexual sensation seeking.

In all, 2991 questionnaires were distributed, of which 2544 could be matched to the STI registration system. The men who received the questionnaire differed from all homosexual men registered in being somewhat older (38.4 vs 37.8 years, $p<0.01$), more often of Dutch nationality (86.5% vs 71.9%, $p<0.01$) and more often diagnosed with infectious syphilis (5.9% vs 4.6%, $p = 0.01$) or RG (7.2% vs 5.7%, $p = 0.01$).

The response rate was 62% (1568/2544) questionnaires and 65% (1391/2120) individuals. The 1391 responders were somewhat older (39.1 vs 37.4 years, $p<0.01$) and more often of Dutch nationality (89.9% vs 81.0%, $p<0.01$) than the non-responders. No further differences were found.

Study population

Of the 1391 men, 12 were excluded due to a missing answer on self-reported HIV status, another 178 were excluded because they reported being HIV positive. This left a convenience sample of 1201 respondents for the present study. These men were somewhat older (38.8 vs 37.6, $p<0.01$) and more often of Dutch nationality (89.9% vs 71.3%, $p<0.01$) than the total group of homosexual clinic visitors in the study period.

Variables

HIV-testing behaviour and HIV status

All men were asked about previous HIV testing, when their most recent test was, and the result of that test. HIV status was defined as recently tested HIV negative (ie, in the past year), not recently tested HIV negative (ie, more than a year ago) and unknown (never tested before). HIV testing at new STI consultation and the test result were registered. Men with an unknown HIV status who were tested at new STI consultation were defined as first-time testers. When an HIV test was refused, the reason for not testing was asked.

Sexual risk behaviour

Risk behaviour was based on self-reported information, and defined as not consistently having used condoms during anal intercourse (AI). It was defined separately for steady and casual partners (SP and CP). Combination of those two variables resulted in one variable with four categories: no or protected AI (reference); unprotected anal intercourse (UAI) with SP only; UAI with CP only; and UAI with both SP and CP.

HAART-related beliefs and motivational factors

The study questionnaire included items measuring HAART-related beliefs, to which participants responded using a 7-point scale ranging from 1, ''strongly disagree'' to 7, ''strongly agree''. Items were, in part, based on earlier studies[10 12 13] and were clustered based on principal component analyses, as in previous studies.[19 20] This approach confirmed four scales, each measuring a HAART-related belief: perceiving less HIV/AIDS threat since HAART (five items, Crohnbach's $\alpha = 0.82$), perceiving less need for safer sex since HAART (three items, Crohnbach's $\alpha = 0.92$), perceiving less risk for HIV transmission due to HAART (two items, correlation (r) = 0.64), and perceiving high effectiveness of HAART in curing HIV/AIDS (three items, Crohnbach's $\alpha = 0.86$). The questionnaire also included items measuring two motivational factors (safer sex fatigue and sexual sensation seeking).[12 21] Safer sex fatigue was measured using four items (eg, I feel tired of always having to monitor my sexual behaviour) with a Crohnbach's α of 0.86. Sexual sensation seeking was measured using two items (eg, I like wild and uninhibited sexual encounters) with a correlation of $r = 0.91$.

Scores on all scales were calculated as the mean scores of the items included. A higher score represented a stronger agreement with the statements.

Statistical analyses

Differences in HIV-testing behaviour among homosexual men visiting the STI clinic in Amsterdam, according to HIV status, were described using χ^2 tests for independence. HIV prevalence was calculated among men who tested at new STI consultation. Determinants associated with (1) having an unknown HIV status (never tested previously), (2) HIV testing at new STI consultation among those with an unknown HIV status (first-time testers), and (3) HIV-testing at new STI consultation among men who tested negative more than a year ago were investigated by logistic regression analysis. Multivariate models were built using a stepwise forward-regression method. A value of $p<0.05$ was considered significant.

We checked for interaction between the statistically significant variables. Confounding was defined as present when inclusion of a non-significant variable in the model resulted in a change of >15% in the estimates of predictor variables already present in the model. Analyses were done using the statistical package SPSS V.13.0.

RESULTS

Of the 1201 men included in the study between March 2002 and December 2003, 384 (32%) were unaware of their HIV status. Among the 817 men reporting a negative HIV status, 280 (34.3%) had been tested recently and 486 (59.5%) had been tested more than a year ago. For 6.2%, information about the date of last HIV-negative test was lacking.

Testing rates at new STI consultation, HIV prevalence and reasons for not testing

In all, 523 (43.5%) homosexual men with a negative or unknown HIV status were tested for HIV at new STI consultation. Testing rates were higher among not-recently-tested HIV-negative men (52.9%) than among never-tested (37.5%) and recently tested HIV negative (35.7%; $p<0.01$). HIV prevalence among all testers was 2.8% (14/523), being somewhat higher among first-time testers (6/144, 4.2%) than among those tested negative recently (1/100, 1%) and not recently (7/257, 2.7%), although not significant ($p = 0.33$). Compared to men with a negative test result, men with a positive result reported more UAI with CP (30.8% vs 14.2%, $p = 0.01$) and UAI with both SP and CP (38.5% vs 12.3%, $p = 0.01$) in the previous 6 months. Furthermore, they were more often coinfected with RG (21.4% vs 5.3%, $p = 0.01$) and infectious syphilis (14.3% vs 5.1%, NS).

Self-reported reasons for not testing included low perceived risk of being infected with HIV (37.3%), fear of a positive test and the consequences, and not wanting to know or not ready yet (23%). Some men indicated that they will be tested within a couple of months, partly due to the window period of HIV (7.4%). Finally, 20.4% of men with unknown HIV status and almost 10% of the HIV-negative men gave no reason for not testing.

Determinants associated with having an unknown HIV status (never tested before)

In total, 32% of the homosexual men in this study (384/1201) never tested for HIV before. Univariate determinants (table 1) of having an unknown HIV status were age <30 years and >49 years, Dutch nationality and diagnosed infectious syphilis at new STI consultation. Furthermore, men who reported UAI with SP and men who reported UAI with both CP and SP were less likely to be never tested before than those men reporting no or protected AI. Finally, men who reported a higher level of safer sex fatigue were less likely to have an unknown HIV status than those reporting lower levels of safer sex fatigue. Multivariate analyses (table 1) revealed that age <30 years, Dutch nationality and diagnosed infectious syphilis at new STI consultation were independently associated with having an unknown HIV status. Furthermore, men who reported UAI with SP were less likely to be never tested before than men who reported no or protected AI with CP and SP.

HIV testing at new STI consultation among homosexual men who never tested before

The first-time testing rate in this study was 37.5% (144/384). Univariate determinants (table 2) of first-time testing were age <30 years and UAI with SP in the previous 6 months. For men reporting UAI with both SP and CP, testing rates were lower than for men reporting no or protected AI, although not statistically significant. In multivariate analyses both age <30 years and UAI were found to be independently associated with testing. Moreover, a significant interaction effect between age and UAI ($p<0.02$) was found. As effects were similar for the age category ≥30 years, we dichotomised the age variable for the stratified analysis. Stratification by age category (table 2) revealed that among men aged <30 years, UAI with CP only, and UAI with both SP and CP in the previous 6 months, were associated with lower rates of HIV testing than among men reporting no UAI. By contrast, among men aged >30 years, UAI with SP only and UAI with CP only were associated with more testing than among older men reporting no UAI in the previous 6 months.

HIV testing at new STI consultation among not-recently-tested HIV-negative men

The testing rate among not-recently-tested men was 52.9% (257/486). Results from univariate and multivariate analyses demonstrate that age <30 years was independently associated with higher rates of HIV testing at new STI consultation (OR adjusted 1.83, 95% CI 1.02 to 3.27). Furthermore, HIV testing

Table 2 Prevalence of and determinants associated with first-time HIV testing at new STI consultation, among 384 homosexual men with an unknown HIV status in the period 2002–2003, Amsterdam, The Netherlands

Determinants	Prevalence n/n (%)	OR	95% CI	p Value	OR adj *	95% CI	p Value	OR adj *	95% CI	p Value
Age category (years)†				<0.01	Age <30 years			Age ⩾30 years		
<30	61/94 (64.9)	4.38	2.48 to 7.73	<0.01						
30–39	38/128 (29.7)	1								
40–49	31/105 (29.5)	0.99	0.56 to 1.75							
⩾50	14/57 (24.6)	0.77	0.38 to 1.57							
Educational level				0.14						
Low	37/78 (47.4)	1								
Middle	55/156 (35.3)	0.60	0.35 to 1.05							
High	51/145 (35.2)	0.60	0.34 to 1.05							
Dutch				0.14						
No	12/23 (52.2)	1								
Yes	132/361 (36.6)	0.53	0.23 to 1.23							
AI (in the previous 6 months)†				0.01			0.02			<0.01
No/protected AI with CP and with SP	65/187 (34.8)	1			1			1		
UAI with SP only	42/82 (51.2)	1.97	1.16 to 3.34	<0.01	0.38	0.13 to 1.09		2.96	1.52 to 5.78	<0.01
UAI with CP only	23/65 (35.4)	1.03	0.57 to 1.86		0.13	0.03 to 0.61	<0.05	1.92	0.98 to 3.75	
UAI with CP and with SP	8/38 (21.1)	0.50	0.22 to 1.16		0.15	0.03 to 0.76	<0.05	0.69	0.25 to 1.95	
STI diagnosed at new STI consultation										
Infectious syphilis				0.70						
No	133/352 (37.8)	1								
Yes	11/32 (34.4)	0.86	0.40 to 1.85							
Rectal gonorrhoea				0.07						
No	129/356 (36.3)	1								
Yes	15/28 (53.6)	2.03	0.94 to 4.40							

	Mean (SD)	OR	95% CI	p Value
HAART-related beliefs (1, disagree; 7, agree)				
Perceiving less HIV/AIDS threat since HAART	2.47 (1.26)	0.98	0.83 to 1.15	0.77
Perceiving less need for safe sex since HAART	2.60 (1.48)	1.08	0.77 to 1.51	0.65
Perceiving less risk for HIV transmission due to HAART	1.20 (0.74)	1.06	0.93 to 1.22	0.37
Perceiving high effectiveness of HAART in curing HIV/AIDS	1.78 (1.17)	1.08	0.90 to 1.29	0.42
Motivational beliefs (1, low level; 7, high level)				
Perceiving higher level of safe sex fatigue	2.53 (1.51)	0.92	0.80 to 1.06	0.25
Perceiving higher level of sexual sensation seeking	5.19 (1.88)	1.10	0.98 to 1.24	0.10

AI, anal intercourse; CP, casual partner; HAART, highly active antiretroviral therapy; SP, sexual partner; STI, sexually transmitted infection; UAI, unprotected anal intercourse.
*OR adjusted for the other variables in the multivariate model.
†A significant (p<.01) interaction term was found for age and anal intercourse; therefore, multivariate results are presented stratified by age category.

rates were higher among men who engaged in UAI with both SP and CP (OR adjusted 2.04, 95% CI 1.05 to 3.95) than among men who reported no UAI.

DISCUSSION

Although HIV-testing rates have increased in recent years,[1 22] there is still a substantial proportion of homosexual STI clinic visitors in Amsterdam who never tested for HIV before (32%). This proportion is high compared with other cities with large gay communities, like San Francisco and Sydney, where the proportion of never-tested men is <10%.[8 9] These differences most probably reflect the fact that in the Netherlands HIV testing was promoted only after HAART became available. In other industrialised countries promotion of HIV testing started much earlier.

The HIV prevalence among the 523 men who tested for HIV at new STI consultation was 2.8%. Those who tested HIV positive engaged in high-risk sexual behaviour in the previous 6 months and were coinfected with RG at STI consultation more often than men who tested negative. Unfortunately, this study could not establish whether men who tested positive were recently infected with HIV or had a longstanding HIV infection. Therefore, it is not clear whether these men were infected with HIV through engaging in UAI in the past 6 months or whether they were a source of infection for their sexual partners. In both cases, however, there is a risk for ongoing HIV transmission.

An important finding is that there seem to be some groups at a high risk of HIV with a relatively high proportion of homosexual men who are not aware of their HIV status. The proportion of men with an unknown HIV status was higher among those diagnosed with infectious syphilis at new STI consultation. Furthermore, men who reported UAI with CP were as likely as men who reported no or protected anal intercourse with CP and with SP to be never previously tested. Their first-time HIV-testing rates, however, were lower, and therefore an important high-risk group might be missed. Especially, never-tested men <30 years who reported high-risk sexual behaviour tested the least. As a result, it is probable that some young homosexual men in Amsterdam are unaware of their HIV-positive status, while engaging in high-risk sexual behaviour. This finding is in line with studies from the US,[6 7] and implies a risk of ongoing HIV transmission. Furthermore, it confirms the need for ongoing STI testing, including HIV.

HIV testing rates might be further increased by new diagnostic methods such as rapid HIV testing,[23] which has been implemented at the STI clinic in Amsterdam.[24] Certainly, HIV testing should be promoted in addition to ongoing primary prevention of HIV and other STI. Recently, motivational interviewing has been incorporated in counselling at the STI clinic in Amsterdam. If it turns out to be a valuable counselling method for reducing sexual risk behaviour[25 26] among homosexual men, it might also help to

improve the uptake of HIV testing. Counselling should additionally address issues such as fear of testing, perceived risk of HIV infection and the consequences of a positive test result.

Among men who tested HIV negative more than a year ago, those who engaged in high-risk behaviour were most likely to be tested for HIV at new STI consultation. These men seem to acknowledge their risk for HIV infection and, therefore, get tested for HIV. The relatively low HIV prevalence (1%) among men who tested HIV negative less than a year ago could suggest that it concerns the worried well who regularly test for HIV irrespective of their behaviour.

Contrary to our hypothesis, HAART-related beliefs and motivational factors played little or no role in understanding HIV-testing behaviour among homosexual men with a negative or unknown HIV status, although they do play a role in their sexual risk behaviour and STI acquisition.[10–20]

Obviously, care should be taken in generalising the results of this study to all homosexual men in the Netherlands. Homosexual visitors to the STI clinic may represent men who more often engage in risky sexual behaviour and, therefore, are at a higher risk for STI than (Dutch) homosexual men in general. As a result, the testing rates presented are likely to be higher than among homosexual men in the Netherlands. However, the testing rate we found is comparable with the rate among homosexual men in Amsterdam.[22] Another limitation includes the fact that HIV status was based on self-reported information, perhaps leading to under-reporting of HIV-positive status. However, questionnaires were anonymous which most likely reduced socially desirable answering.

In conclusion, HIV testing rates among homosexual men in Amsterdam have improved in recent years, although rates are still low compared with developed countries with a longer history of HIV testing promotion. Despite increasing HIV-testing rates there is an ongoing risk for HIV transmission, which emphasises the need for more active testing promotion. In particular, those aged <30 years and engaging in high-risk sexual behaviour should be targeted since they are at a high risk for getting infected or infecting others with HIV and other STI.

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IGS analysed and interpreted the data and drafted the manuscript; MEK contributed to the acquisition and interpretation of the data and commented on the manuscript; HSAF contributed to the interpretation of the data and commented on the manuscript; RAC contributed to the interpretation of the data and helped in drafting the manuscript; JBFdW supervised the study, contributed to the interpretation of data and commented on the manuscript; NHTMD supervised the study, contributed to the interpretation of data and commented on the manuscript.

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Key messages

- HIV testing rates among homosexual men in the Netherlands have improved, but are still low compared with other developed countries.
- Despite increasing HIV testing rates, there is an ongoing risk for HIV transmission, which emphasises the need for promotion of more active HIV testing.
- Especially men aged <30 years who are unaware of their HIV status while engaging in high-risk behaviour should be targeted for promotion of active HIV testing.

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